Volume 18 APRIL 8, 1943 Number 2

BULLETIN

OF THE

AMERICAN PHYSICAL SOCIETY

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PROGRAMME OF THE

COLUMBUS MEETING

AT

THE OHIO STATE UNIVERSITY

COLUMBUS, OHIO

April 30 and May 1, 1943

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The American Physical Society

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The President, Vice President, Secretary, Treasurer, Managing Editor, the three Past Presidents most recently retired from office, eight elected members and all Past Presidents first elected to the office of President prior to December 1932 constitute the Council which shall have general charge of the affairs of the Society.

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APRIL 8, 1943 Vol. 18, No. 2

BULLETIN

OF THE

AMERICAN PHYSICAL SOCIETY

COLUMBUS MEETING, APRIL 30–MAY 1, 1943

THE **254th meeting of the American Physical Society** will be held at Columbus, Ohio, on the campus of the Ohio State University, on Friday the thirtieth of April and Saturday the first of May, 1943. The departure from the Eastern seaboard is inspired partly by the unavailability of Washington and Baltimore, partly by the facts that the last previous meeting was in New York and the next following will be in Pennsylvania, and partly by the courtesy of the Ohio State University in offering us its hospitality for the second time in less than four years. Our meeting will be a joint meeting with the Ohio Section of our Society and with Section F (Physics) of the Ohio Academy of Science. All of our sessions will be held in Room 100 of the Commerce and Administration Building, close to the Mendenhall Laboratory of Physics. The first session will begin at 10:30 o'clock on Friday morning.

Hotel. The headquarters hotel will be the Deshler-Wallick, which offers us rooms at rates of $3.30 per day and up single, $5.50 per day and up double (and also rooms for three persons at $2.75 per person). To go from the hotel or from the Union Station to the University, take a High street car marked "Blenheim Road" or "Oakland Park avenue" or "Arcadia avenue," and get off at the intersection of 15th avenue and High street.

The **registration desk** will be located in the Mendenhall Laboratory of Physics.

A **lecture by P. Debye** on "The Magnetic Approach to the Absolute Zero of Temperature" will be given on Thursday evening, April 29th, before the Ohio Chapter of Sigma Xi which graciously invites us to attend. The hour is eight P.M., the place is Room 100 of the Chemistry Building.

Contributed ten-minute papers will be given in two sessions, commencing Friday morning at 10:30 and Saturday afternoon at two.

An **invited paper by K. Lark-Horovitz** on "Semi-Conductors: Their Properties and Their Uses" will be given on Friday afternoon at two.

A part of the **symposium in honor of Galileo** (died 1642) **and Newton** (born 1642), which was arranged by the A.A.A.S. for its New York meeting of December last and was abandoned when that meeting was called off, has been saved for our Columbus meeting through the courtesy of Henry Crew and Louis T. More in consenting to give before us such papers as they had intended for the lost symposium. These will be presented on Friday afternoon, beginning at 3:30.

HENRY CREW, Northwestern University: *Galileo, the Pioneer Physicist.*

Notice reservation form for dinner on inside back cover page.

LOUIS T. MORE, University of Cincinnati: *Newton's Philosophy of Nature.*

A symposium on applied infra-red spectroscopy will be held on Saturday morning commencing at 10:00. The speakers and their topics are:

R. BOWLING BARNES, American Cyanamid Company: *Applied Infra-Red Spectroscopy.*

J. R. DOWNING, DuPont Experimental Station: *Applications of Infra-Red Spectroscopy to Chemical Research.*

H. H. NIELSEN AND ELY E. BELL, Ohio State University: *Automatic Recording Vacuum Infra-Red Grating Spectrometer.*

The **dinner** of the Society, at which all who are interested in the meetings will be welcome, will be held at the Deshler-Wallick Hotel at seven o'clock on Friday evening at a price of $2.06 per plate. Charles F. Kettering of the General Motors Corporation will speak during the after-dinner programme on "Looking Forward through Research." Members and guests are requested to make advance reservation by letter or card addressed to Dean Alpheus W. Smith at the Mendenhall Laboratory of Physics, Ohio State University, Columbus. To make this easier a form of reservation has been printed on the inside back cover page of this Bulletin. Tickets will be held at our registration desk, also at the Information Desk in the hotel.

The **Council of the American Physical Society** will meet on Friday at 10:45 A.M. in a room to be indicated to the members by later communication.

Sigma Pi Sigma Luncheon. The annual luncheon for members and guests of this society, held in conjunction with the spring meeting of the Physical Society, is scheduled for 12:15 on Friday, April 30, in the Medallion Room of Pomerene Refectory, near Mendenhall Laboratory. Tickets at 85¢ each may be purchased at the registration desk until 10:00 A.M. Friday. Advance reservations would be appreciated because of the shortness of time at the meetings.

Summer Meetings. The summer meeting in the East will be held at State College, Pennsylvania, on June 17, 18, and 19, 1943, in conjunction with the American Association of Physics Teachers. The summer meeting in the West will be held at Stanford University, California, on July 10, 1943.

GENERAL RULES RELATING TO PAPERS

By vote of the Society on December 27, 1940, no paper may be accepted for presentation at any meeting of the Society unless the title and an abstract of the paper are delivered to the office of the American Physical Society not later than the closing date stated in the printed call for the meeting.

The time allowed for the oral presentation of a contributed paper is ten minutes at most.

When two or more papers are contributed by the same member, all but one are placed on the "supplementary programme." (A paper by two or more members is credited to the one first named in its title.) For each paper on this programme the Secretary indicates a session at which it may be presented. The presiding officer at this session may call for it when the other papers are completed, may require that it be given in shortened form, or may read it by title.

Titles and abstracts of the papers to be presented are given in the following pages. Proofs of these abstracts have not been submitted to the authors. After submission of proof the abstracts will be published in an early number of *The Physical Review.*

KARL K. DARROW, *Secretary,*
American Physical Society,
Columbia University, New York, New York

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PROGRAMME

FRIDAY MORNING AT 10:30 O'CLOCK

Contributed Papers

1. On the Linear Stress-Strain Curves of the Hexagonal Metals. J. S. KOEHLER, *Carnegie Institute of Technology.*—Taylor[1] supposed that in the work-hardened state a crystal contains many line dislocations, all of which are parallel to one another. He obtained the parabolic stress-strain curve of the face-centered cubic metals by assuming that the dislocations are present in a two-dimensional square lattice. We have been able to obtain linear stress-strain curves by using a rectangular dislocation lattice. The resulting formulas have been used to fit the measured stress-strain curves of single crystals of Mg, Zn, Cd.[2] The dislocation spacing in highly work-hardened hexagonal metals is about 10^{-6} cm in agreement with previous estimates. In the case of Cd at low temperatures the stress-strain curves show a sudden change of slope. Our expressions fit the lower straight-line section only. The change in slope may possibly be due to a change in the mechanism of plastic deformation. It may be that twinning plays a role in the deformation occurring at large stresses.

[1] G. I. Taylor, Proc. Roy. Soc. **145**, 362 (1934).
[2] E. Schmid and W. Boas, *Kristallplastizität* (Springer, 1935), p. 158.

2. Cathode Drop and Current Density in Welding Arcs. G. H. FETT, *Department of Electrical Engineering, University of Illinois.*—Experiments to determine the cathode drop of welding electrodes in air at atmospheric pressure and to compute the electron density in the arc were continued using the method previously described.[1] The cathode drop for certain d.c. welding electrodes used for hard-surfacing was greatly influenced by the coating, the values changing from 9.4 to 14 volts after the coating was removed in the extreme case. Mild steel electrodes showed little or no change with coating removal. The electron density computed values was not proportionately influenced by the coating. Experiments involving currents less than one ampere indicate that with these electrodes the current density increases with a decrease in current. At values of current above 5 amperes the current density is constant for any given electrode, and is influenced by the type of electrode more than the coating. The energy lost by the arc due to convection varies directly with the arc perimeter. Hence the current density must increase as the current decreases in order that the arc temperature within the core be held constant. This proportional increase in loss with reduction in current may account for the fact that arc currents below a certain minimum, usually about 0.3 ampere, cannot be maintained despite the use of fairly high potentials.

[1] G. H. Fett, Welding Res. Supp. **21**, 27 (1942).

3. Magnetic Potential Energy. F. W. WARBURTON, *University of Kentucky.*—Treatment of magnetic energy as external (potential) energy in the sense of a modification of electrostatic energy due to electron motion, makes use of the classical Lagrangian function for the energy of the electron in a magnetic field. However, a Hamiltonian function defined in terms of the mechanical momentum rather than the classical canonical momentum differs from the classical Hamiltonian by including explicitly the magnetic potential energy, and equals the total energy. The change in magnetic potential energy upon adding a magnetic field is equal in a first approximation to the Larmor precession increase in rotational kinetic energy. The two give a change in energy proportional to e/mc and provide a simple interpretation of the gyromagnetic experiments and the so-called electron spin. The omission of the canonical momentum and the proof that the Hamiltonian remains constant in time, is not violation of conservation of energy, and it permits an electron-proton pair to release part of their energy in radiation in accord rather than at variance with the added requirements of quantum theory.

4. A Physical Mechanism for the Nebular Red Shift. L. H. THOMAS, *Ohio State University.*—It seems possible to account for the nebular red shift by a second-order effect of ordinary coherent refraction. When a wave train, regarded as plane and infinite in lateral extent, but finite in length, advances through a refracting medium, the parts of which are not elastically anchored in position, the medium receives as the front of the wave train advances over it an average velocity in the direction of propagation of the wave train. This results from the second-order effect of the magnetic field of the wave train on the first-order transverse velocities, lagging in phase, of the material particles. If there is no "frictional" resistance, this velocity is lost as the back of the wave train passes, the medium is left undisturbed, and the wave train is propagated undisturbed. If "frictional" resistance (which may be the statistical effect of waves passing in other directions) damps out the

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velocity in the direction of propagation, the wave train as a whole is gradually reddened. The whole process is coherent and occurs even in the approximation of geometrical optics. It would not be expected that it should be possible to observe it under laboratory conditions, because a velocity of the medium in the direction of propagation of the wave train is then opposed by elastic restoring forces.

5. A Recording Relay For An Infra-Red Spectrograph. ELY E. BELL, *Ohio State University.*—A recording photoelectric bridge has been constructed for use with an infrared, grating spectrograph which is able to reproduce the 3.2-mu water vapor band with detail equivalent to that previously obtained with point-by-point measurements under similar conditions. A single base mounting a light source, a Moll bifilar galvanometer, and a pair of phototubes are supported inside of a heavy metal tank containing the spectrograph. Here the relay is relatively free from temperature fluctuations and from vibrations. An unbalance of light on the photo-tubes is applied to commercial recording milliammeters through a bridge circuit similar to that of McAlister, Matheson, and Sweeney[1] except that an additional stage of amplification has been added. A provoked potential of 10^{-8} volt in the thermocouple is recorded as readily distinguishable from the background.

[1] E. D. McAlister, G. L. Matheson, and W. J. Sweeney, Rev. Sci. Inst. 12, 314 (1941).

6. The Infra-Red Spectrum of Methyl Fluoride at 9.5μ. K. P. YATES AND V. MILLER, *Ohio State University.*—The infra-red band, ν_8, at 9.5μ in the spectrum of methyl fluoride was first investigated under high dispersion by Bennett and Myer in 1928 who showed it to be of the parallel type. The data seemed to indicate, however, that some of the rotational lines, particularly in the *P* branch, were complex in structure. This has been investigated by the writers under higher dispersion than that available to Bennett and Myer. The curve obtained agrees with that of Bennett and Myer in general details, but most of the rotational lines in both the *P* and *R* branches are split up into component structure. The effect appears to be related to the convergence of the lines in the band and it seems reasonable to ascribe it as due principally to a Coriolis resonance interaction between the parallel type vibration ν_6 at 1048 cm^{-1} and the perpendicular type vibration ν_8 at 1200 cm^{-1}. The contour of the band ν_8 of CH_3F is at present being obtained in order to determine in what manner the resonance interaction affects this vibration.

7. Raman Spectra of Diisobutylene, Cyclohexene, and Dipentene. FORREST F. CLEVELAND, *Illinois Institute of Technology.*—In continuing work on olefinic hydrocarbons, Raman frequencies, relative intensities, and depolarization factors have been obtained for diisobutylene, cyclohexene, and dipentene. The relative intensities and depolarization factors were obtained by use of a Gaertner microdensitometer. Diisobutylene is a mixture of the two isomers 2,4,4-trimethyl-1-pentene and 2,4,4-trimethyl-2-pentene, the present sample containing only about 15 percent of the latter isomer. Raman frequencies and estimated intensities for the two isomers have been obtained previously (Rank and Bordner), but the present investigation provides the first polarization data and more accurate measurements of the intensities. Raman frequencies and estimated intensities have also been reported for cyclohexene and dipentene, but no polarization data or reliable intensity measurements seem to exist in the literature. Dipentene has a ring structure identical with that of cyclohexene and it is thus of interest to compare the spectra of these two compounds. The olefinic frequencies at 1653(447)0.14, 3022(508)0.19, and 3058(19) in the cyclohexene spectrum appear at 1682(219)0.35, 3012(54)P, and 3050(26)P in the spectrum of dipentene. The olefinic frequencies previously observed at 1303(52)0.64, 1414(108)0.81, 1653(203)0.20, 1674(55)P, 2978(253)P, and 3077(47)0.70 for 2-methyl-1-heptene, which contains the group $XYC=CH_2$, appear at 1236(104)-0.63, 1410(155)0.62, 1644(161)0.33, 1658(51)0.60, 2977-(790)P, and 3072(32)0.71 for diisobutylene and at 1290-(46)0.72, 1376(127)0.70, 1648(213)0.38, 2983(115)P, and 3078(16)D for dipentene.

8. Magnetolysis and the Electric Field Around the Magnetic Current. FELIX EHRENHAFT, *New York City.*—Between the vertical cylindrical poles (magnetodes) of an electromagnet of soft Swedish iron, whose bases form a horizontal gap (pole diam. 8 mm, gap 1–2 mm) acidulated water (one percent H_2SO_4 by volume) is decomposed into oxygen and hydrogen gas. Hereby the old problem of the alchemists about the decomposition of water through the magnet has been solved. As long as the two poles immersed in the solution are not magnetized we get pure hydrogen, but as soon as the two poles are magnetized we get a mixture of hydrogen and oxygen (about 2–12 percent oxygen). The amount of gases evolved magnetically is proportional to the magnetic field (first magnetolytic law). Microscopic observation shows that magnetically evolved gas bubbles carry either a North or South magnetic charge.* Magnetolysis and electrolysis have been superposed. After a swarm of positive electrically charged hydrogen bubbles are produced, the magnetodes were short-circuited electrically. Each of these positive charged gas bubbles moves in a circle around the gap between the magnetodes, through which a constant magnetic current flows, reversing its direction on reversion of the magnetic field, exactly as a single magnetic pole would circulate around the constant electric current, reversing its direction with the reversal of the electric field (Oersted, Faraday). The magnetic current is surrounded by circular electric lines of force (second method of measuring the magnetic current). Photographs demonstrating these phenomena will be shown. The experiments can be seen at C. Zeiss Inc. New York, whom the author thanks for their hospitality.

* Papers by F. Ehrenhaft and L. Banet, *Physical Review* and *Science*, 1941 and 1942.

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FRIDAY AFTERNOON AT 12:15 O'CLOCK

Medallion Room, Pomerene Refectory

Sigma Pi Sigma Annual Luncheon for Members and Guests

FRIDAY AFTERNOON AT 2:00 O'CLOCK

Invited Paper

Semi-Conductors: Their Properties and Their Uses. K. LARK-HOROVITZ.

FRIDAY AFTERNOON AT 3:30 O'CLOCK

Symposium in Honor of Galileo and Newton

Galileo, the Pioneer Physicist. HENRY CREW, *Northwestern University, Evanston, Illinois.*

Newton's Philosophy of Nature. LOUIS T. MORE, *University of Cincinnati, Ohio.*

FRIDAY EVENING AT 7:00 O'CLOCK

Deshler-Wallick Hotel

Dinner

FRIDAY EVENING AFTER THE DINNER

Deshler-Wallick Hotel

Looking Forward Through Research.

CHARLES F. KETTERING,

General Motors Corporation, Detroit, Michigan.

SATURDAY MORNING AT 10:00 O'CLOCK

Symposium on Applied Infra-Red Spectroscopy

Applied Infra-Red Spectroscopy. R. BOWLING BARNES, *American Cyanamid Company.*

Applications of Infra-Red Spectroscopy to Chemical Research. J. R. DOWNING, *DuPont Experimental Station.*

Automatic Recording Vacuum Infra-Red Grating Spectrometer. H. H. NIELSEN AND ELY E. BELL, *Ohio State University.*

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SATURDAY AFTERNOON AT 2:00 O'CLOCK

Contributed Papers

9. Combined Electron Diffraction and Microscope Apparatus. A. F. PREBUS, *The Ohio State University.* (*Introduced by Alpheus W. Smith.*)—A modified magnetic electron microscope is described which permits the observation of both highly magnified images and transmission electron diffraction patterns of identical microscopic specimen areas.

10. Investigation of Large Cosmic-Ray Bursts in Iron. R. E. LAPP, *The University of Chicago.*—During the past year experiments have been carried out with a Model C ionization chamber operated specifically to record cosmic-ray bursts. The steel chamber was completely shielded by 35 cm of iron and bursts with 150 to 3000 particles were recorded. Mesotrons producing bursts of such magnitude must have energies up to 6×10^{11} ev. Comparison of the size frequency distribution curve of large bursts in 35 cm of iron was made with the theoretical calculations of Christy and Kusaka.* The observed burst frequency was in agreement with a mesotron having spin 0 or $\frac{1}{2}$, but was in definite disagreement with spin 1. In addition, the recording system of the ionization chamber was coupled so as to record simultaneously coincidences of G-M counter coincidence sets placed above the apparatus. The counters in each 2-fold set were separated by from 2 to 10 meters to detect air showers. Preliminary results indicate that bursts under 35 cm of iron are not coincident with air showers to an accuracy of less than 10 percent. With the chamber completely unshielded and with negligible material in the vicinity, coincidences were observed between bursts and air showers. The experiments are being continued with 2-, 3-, and 4-fold coincidence sets and experiments are also in progress with a 12-cm iron shield around the ionization chamber.

* R. F. Christy and S. Kusaka, Phys. Rev. **59**, 414 (1941).

11. Measurements of Cascade Showers Produced by Ionizing and Non-Ionizing Radiation in the Stratosphere. JULIUS TABIN AND MARCEL SCHEIN, *University of Chicago.*—By using a cosmic-ray balloon apparatus, electron-produced and photon-produced cascade showers were measured below a 2-cm lead plate. The showers were detected by means of four Geiger-Müller counters placed below and an additional anticoincidence counter placed above the lead. The apparatus reached an altitude corresponding to 2.5 cm of Hg pressure. At a pressure of 3 cm Hg (first radiation unit from the top of the atmosphere) it was found that 71 percent of the showers below the lead were produced by non-ionizing and 29 percent were produced by ionizing radiation.

12. Factors Influencing the Plateau Characteristics Of Self-Quenching G-M Counters. W. SPATZ, *New York University.*—Investigations of factors influencing the starting potential and plateau slope of self-quenching G-M counters show: I. Impurities such as air or oxygen increase the plateau slope and starting potential of argon-alcohol counters. II. Operation of the counter causes changes in plateau characteristics as follows: (a) Immediately after use, the plateau slope increases slightly, (b) With continued use the plateau slope becomes steeper. (c) For moderate use the counter recovers when inactive, but never to the original characteristics. (d) With further use, the counter loses its plateau and does not recover. (e) The pressure in an argon-alcohol counter was observed to increase as a function of the total number of counts recorded. III. For argon-alcohol counters the useful life in these experiments was found to be about 10^9–10^{10} counts; for argon-methane, 10^7–10^8 counts. The lifetime may be seriously shortened by operating at high overvoltages, by allowing breakdown to occur, or by using any circuit permitting large currents to flow. The observed changes of characteristics are presumably due to the decomposition of the organic vapor by the discharge.

13. Threshold for the Nuclear Photo-Effect. G. C. BALDWIN AND H. W. KOCH, *University of Illinois.*—With the method previously described[1] for controlling the peak energy of the x-rays from the 20-Mev betatron, (γ, n) reactions have been observed and their thresholds determined in the following elements since the last report: Zn (39 min.) 11.6±0.4 Mev; N (10 min.), 11.1±0.5 Mev; In (1.1 min.), 9.3±0.5 Mev; Ag (2.3 min.), 9.3±0.5 Mev; Se (0.7 min.), 9.7±0.5 Mev. These values are upper limits for the thresholds. Ag and Se also show strong 25- and 57-minute activities, respectively. Analysis of decay curves taken at varying energies indicates that these activities have higher thresholds than those listed above. An improved determination of the $O^{16}(\gamma, n)O^{15}$ threshold has been made, giving 16.3±0.4 Mev. This and the nitrogen threshold are in fair agreement with values predicted from mass data. Chief sources of error in the method are (1) gradual change in energy calibration with time and (2) low ratio of activity to counter background near threshold, making estimation of a lower limit difficult.

[1] G. C. Baldwin and H. W. Koch, Phys. Rev. **63**, 59 (1943).

14. The Relative Intensities and Characteristic Radiations of Radioactive Scandium. CARL T. HIBDON, M. L. POOL, AND J. D. KURBATOV, *Ohio State University.*—A reinvestigation of the radioactive isotopes of scandium has yielded a new isotope of half-life 3.4 days. This isotope emits electrons of 0.46 Mev but no gamma-rays. Other data obtained by appropriate bombardments of K, Ca, Sc, Ti

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and V with alpha-particles, deuterons, protons, slow and fast neutrons include the following:

Isotope	Half-life	Energy of β in Mev	Energy of γ
Sc^{43}	3.92 hr.	1.13 positrons	1.65 Mev
Sc^{44}	3.92 hr.	1.33 positrons	1.80 Mev
Sc^{44}	2.44 day	1.33 positrons	0.28 and 1.33
Sc^{48}	1.83 day	0.57 electron	1.33 Mev

No evidence was found for the existence of the 13.2-day nor the 2.62-day periods previously assigned to Sc^{42} and Sc^{47}, respectively. The Ca(p, n) reaction yielded Sc^{43} and Sc^{48} but not Sc^{44}. With deuteron bombardment of calcium the most abundantly produced isotope is Sc^{46}; the isomers of Sc^{44}, however, are not produced by this reaction in equal proportions as they are by the Sc(n, $2n$) and K(α, n) reactions. The scandium oxide used was of high purity and kindly furnished by Professor Quill of the University of Kentucky.

15. The Artificial Radioactivities of Cerium. M. L. POOL AND J. D. KURBATOV, *Ohio State University.*—Four new radioactive isotopes have been produced and assigned positions in cerium and praseodymium. Ce^{140}, which has a half-life of 140 days, is obtained by the reactions $Ba^{137}(\alpha, n)$ and $La^{139}(d, n)$. The fact that gamma-rays only (of 0.21 Mev) are emitted by this isotope is consistent with the isomeric assignment. A 30-day activity is assigned to Ce^{141} and has been obtained by the reactions $Ba^{138}(\alpha, n)$, $Ce^{140}(d, p)$, $Ce^{140}(n, \gamma)$, $Ce^{142}(n, 2n)$ and $Pr^{141}(n, p)$. The isotope emits beta-particles of 0.65 Mev and gamma-rays of 0.2 Mev. Ce^{141} is of particular interest because of the unusual arrangement of stable isotopes in the cerium region. A 36-hour activity, assigned to Ce^{143}, has been produced by the reactions $Ce^{142}(d, p)$ and $Ce^{142}(n, \gamma)$. This substance forms a chain reaction by disintegrating into Pr^{143}. Pr^{143} in turn disintegrates with a half-life of 13.5 days by the emission of 0.95 Mev beta-particles. No gamma-rays are emitted. The study of the above radioactive isotopes and the clarification of certain meagerly detailed published data on radioactive cerium has been made possible and expedited by improved methods used in the separation of cerium from praseodymium and lanthanum.

16. Progress Report on the Radioactivities in the Illinium Region. J. D. KURBATOV AND M. L. POOL, *Ohio State University.*—A continuation of comparative studies of the radioactivities of Pr, Nd, Il, Sm, and Eu has led to the following results. The nuclear reaction Nd(p, n) produces the periods 2.7 hours and 5.3 days. Both activities disintegrate with the emission of gamma-radiation and 2-Mev electrons; this suggests an isomeric position for the two isotopes in illinium. The nuclear reaction Nd(d, n) produces, in addition to the above, a period of 16 days. The disintegration takes place with the emission of gamma-radiation and 1.7-Mev electrons. The same activation yields a long period of about one year. Gamma-rays of 0.7 Mev constitute the principal radiations emitted. The activation of samarium with deuterons results in several periods. The Sm(d, n) reaction yields a 40-day activity and a one-year activity. Both are associated with europium and disintegrate mainly by the emission of gamma-rays. Absorption measurements of the gamma-rays of this one-year period presents results comparable to those of the one year period obtained by deuteron bombardment of Nd. Thus a chain reaction of four elements is suggested.

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(To be sent to Dean Alpheus W. Smith, Mendenhall Laboratory of Physics, Ohio State University, Columbus, Ohio)

I EXPECT to attend the dinner of the American Physical Society at the Deshler-Wallick Hotel, Columbus, at seven o'clock on Friday evening, April 30, 1943. My party will consist of ____ persons.